SOIL SURVEY OF ALLEGANY COUNTY, MARYLAND.

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DESCRIPTION OF THE AREA.

Allegany County is the central one of the three mountainous counties of western Maryland. The county is bounded on the north by Somerset, Bedford, and Fulton Counties, Pa.; on the east by Sideling Hill Creek, which separates it from Washington County, Md.; on the southeast and south by the Potomac River, which separates it from Morgan, Hampshire, and Mineral Counties, W. Va.; and on the west by Garrett County, Md. It comprises 414 square miles,[1] or 264,960 acres.

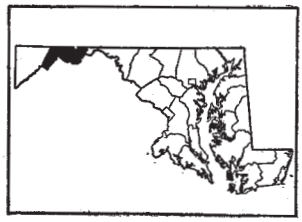

FIG. 36.—Sketch map showing location of the Allegany County area, Maryland.

Allegany County lies in the Appalachian region. This region may be considered, on the basis of differences in physiographic features, to be made up of several divisions. Parts of two of these divisions occur in Allegany County. First, the plateau district, which is a part of the Allegheny Plateau, lying west of the eastern foot of Dans and Piney Mountains. Second, the ridge district, a part of the Allegheny Ridges, including that part of the county lying between Piney Mountain and Sideling Hill Creek. Thus, approximately, the western one-fifth of the county lies in the plateau district and the remaining four-fifths in the ridge district. Topographically the county consists of a succession of parallel sandstone ridges, which cross the State from northeast to southwest, with intervening limestone and shale valleys.

The principal ridges are Dans Mountain, Wills Mountain, Martin Mountain, Warrior Mountain, Polish Mountain, and Town Hill. Shriver Ridge, and Fort Hill are among the more prominent minor ridges subdividing valleys between the major elevations. The average elevation of the principal ridges is about 2,500 feet, although many higher altitudes are attained. The upper slopes of these ridges are unusually steep and rocky, their crests are prevailingly narrow, and

[1] Planimeter measurement.

their lower slopes are longer and less steep than the upper slopes. Dans Mountain and its extension, Little Allegheny, are crossed by streams in but three places. The Potomac River cuts its way through this ridge at Piedmont, W. Va.; Braddock Run passes through 15 miles to the northeast; and 4 miles farther on Jennings Run cuts through Little Allegheny. Wills Creek crosses Wills Mountain near Cumberland before reaching the Potomac, and Town Creek in its upper course crosses Warrior Mountain near Flintstone. Fifteenmile Creek crosses Town Hill northwest of Little Orleans, before it reaches the Potomac. Owing to the hardness of the strata of these ridges, the gorges cut by the streams crossing them are narrow and V shaped.

Generally speaking, the topography of Allegany County is strongly rolling to mountainous. The streams flow in rather narrow, steep-sided channels and are swift and actively cutting their channel beds. In the hilly areas the upper slopes are steep and rocky, and the lower slopes are longer and more gradual. As a rule the higher slopes have not been dissected by erosion very much, because of the hard resistant sandstone which serves as a protective covering for the softer, less resistant strata below. The stream bottoms are almost invariably narrow; a few exceptions exist along the larger streams. Bordering these alluvial deposits are occasional higher lying areas known as river terraces, benches, or second and third bottoms. They are usually small and in many cases lie many feet above the present flood plain, representing in some instances former, more extensive terraces partly removed by erosion.

The Potomac River serves as the principal outlet for the drainage of the county. The major tributary of this river in the western part of the county, below Frostburg, is Georges Creek, whose small branches drain the steep slopes of Dans and Savage Mountains. The drainage of the area north and east of Frostburg is carried by Jennings and Braddock Runs, which flow into Wills Creek near Cumberland. Wills Creek joins the Potomac at Cumberland and drains the area north of this point. The principal tributaries of the Potomac east of Cumberland are Evitts Creek, Town Creek, and Fifteenmile Creek. Most of the larger streams are subject to spring and fall floods and considerable debris has been washed into their channels from the steep slopes which they drain, consequently their flood plains are built up of coarse sand, gravel, cobbles, and bowlders, and in many cases their channels contain large quantities of rounded material of the same character. The gradient of the streams is steep, their currents are swift, and they are still deepening their channels. On the whole, natural drainage is well developed and owing to the topography, the run-off in many places is so rapid as to cause harmful erosion in cultivated fields.

Allegany County was established in 1789, having been created out of what was then included in Washington County and comprised that part of the State west of Sideling Hill Creek. In 1872 a part of Allegany County was taken to form Garrett County, which included the territory west of a line beginning at the summit of Savage Mountain where it crosses Mason and Dixon's line and extending in a straight line to the middle of Savage River where it empties into the Potomac. This line was not permanently established until 1898,

when it was laid out by the Maryland Geological Survey. The first settlement is thought to have been made at Skipton, the present site of Oldtown, about 1760.

The population of Allegany County in 1910 was 62,411, of which 30,569 was classed as urban and 31,842 as rural. The census of 1920 gives the population as 69,938, with 39,831 urban and 30,107 rural. The period from 1910 to 1920 shows an increase in the urban population of 30.3 per cent and a decrease of 5.4 per cent in the rural population. The 1920 census gives the density of the rural population as 68 per square mile. Most of the population is confined to the valleys, which means that settlement in the mountain regions is much sparser than the average density given.

Cumberland, the county seat, is the second largest city of the State, with a population of 29,837. Other incorporated towns of the county, with their population as reported in 1920, are: Frostburg, 6,017; Westernport, 3,977; Lonaconing, 2,054; Midland, 910; and Barton, 765.

The farm products are disposed of largely in these towns. Some produce is shipped to Baltimore, Washington, Pittsburgh, and probably other points. On account of the number of people engaged in mining and other nonagricultural occupations in the county, good prices are obtained for farm products at local markets, and comparatively little produce is sold out of the county.

There are five railroads in the county, namely: The Baltimore & Ohio Railroad main line, a branch of the Pennsylvania Railroad, the Cumberland & Pennsylvania Railroad, the Western Maryland Railway, and the Georges Creek & Cumberland, a branch of the Western Maryland. An electric line extends from Cumberland to Frostburg and thence to Westernport. The Chesapeake & Ohio Canal, traversing the county for a distance of about 50 miles, connects Cumberland with Washington. In the early days this was the principal commercial outlet for the county.

The country roads are rather numerous, except in the hilly areas, and are usually in good condition in the shale regions. In the rougher areas, which are underlain by resistant sandstone, they are usually rough and rocky, and in such places erosion has gone on to such an extent that gullies are frequent and very little more than rock remains. In most cases the roads follow streams or low ridges. There are several miles of State road in the county and plans are made for the construction of more. The Baltimore and Cumberland turnpike traverses the northern part of the county from Sideling Hill Creek to Cumberland. Two other State roads traverse the northwestern part of the county, one leading from Cumberland to Frostburg, the other from Cumberland to the Pennsylvania line toward Bedford, Pa. There is a strong sentiment for road improvement in the county.

Telephones are used generally throughout the county. The rural free delivery of mail is well established, all parts of the county being reached by this service. The county is fairly well supplied with churches and schoolhouses.

CLIMATE.

Allegany County has a temperate, humid climate. The winters are usually long and rather severe, but the summers are ordinarily very

pleasant, with periods of excessive temperatures infrequent and generally of short duration. As a rule, the summer nights are delightfully cool.

The mean annual temperatures at the Weather Bureau stations at Cumberland and Westernport, the only points for which records are available, are 52.6° F. and 52.1° F., respectively. The absolute maximum for these stations is 110° F. and 107° F., and the absolute minimum, −11° F. and −17° F., respectively.

The rainfall is adequate for the normal growth of crops and is well distributed throughout the year. The rainfall is greater during the summer than in the other seasons. The mean annual precipitation at Cumberland is 35.11 inches and at Westernport 34.22 inches.

The average date of the last killing frost in the spring at Cumberland is April 15 and that of the first in the fall is October 23, and the corresponding dates at Westernport are April 28 and October 12, giving an average growing season of 191 days at Cumberland and 167 days at Westernport. The date of the latest killing frost recorded in the spring was May 12 at Cumberland and May 21 at Westernport, and that of the earliest recorded in the fall September 16 at Cumberland and September 20 at Westernport.

The following tables give the more essential climatic data in detail:

Normal monthly, seasonal, and annual temperature and precipitation at Cumberland.

[Elevation, 623 feet.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1904).	Total amount for the wettest year (1890).	Snow, average depth.
	°F.	°F.	°F	Inches.	Inches.	Inches.	Inches.
December	33.8	76	−5	2.53	1.97	3.77	4.7
January	31.1	73	−11	2.54	3.08	1.46	8.7
February	32.6	74	−7	2.78	1.23	4.24	9.6
Winter	32.5	76	−11	7.85	6.28	9.47	23.0
March	38.7	83	0	3.11	1.66	5.18	5.9
April	53.4	96	16	2.71	2.70	3.58	1.3
May	65.0	101	31	3.52	1.33	7.13	T.
Spring	52.4	101	0	9.34	5.69	15.89	7.2
June	70.2	110	34	3.94	2.45	3.07	.0
July	73.8	102	47	3.20	1.44	1.67	.0
August	72.0	109	46	3.51	2.34	7.07	.0
Summer	72.0	110	34	10.65	6.23	11.81	.0
September	64.9	98	32	2.69	.60	6.77	.0
October	53.9	90	26	2.42	.61	6.65	T.
November	42.2	79	10	2.16	.55	1.83	1.1
Fall	53.6	98	10	7.27	1.76	15.25	1.1
Year	52.6	110	−11	35.11	19.96	52.42	31.3

Normal monthly, seasonal, and annual temperature and precipitation at Westernport.

[Elevation, 1,000 feet.]

Month.	Temperature.			Precipitation.			
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year (1895).	Total amount for the wettest year (1921).	Snow, average depth.
	°F.	°F.	°F.	Inches.	Inches.	Inches.	Inches.
December	32.5	70	−8	2.22	1.91	2.44	4.6
January	30.4	76	−17	2.48	1.91	2.64	10.0
February	30.3	76	−13	3.05	.75	2.03	8.9
Winter	31.1	76	−17	7.75	4.57	7.11	23.5
March	41.5	89	0	2.80	.56	1.89	6.2
April	51.4	95	16	2.54	.97	6.24	2.0
May	62.3	95	24	3.40	.25	3.31	.0
Spring	51.7	95	0	8.74	1.78	11.44	8.2
June	68.9	100	36	4.00	.75	5.87	,0
July	73.4	107	42	3.79	1.99	4.65	.0
August	71.9	107	40	3.50	1.08	6.00	.0
Summer	71.4	107	36	11.29	3.82	16.52	.0
September	66.0	102	29	2.50	.54	1.75	.0
October	54.3	93	18	2.26	1.30	4.76	T.
November	42.5	87	9	1.68	.70	4.05	1.6
Fall	54.3	102	9	6.44	2.54	10.56	1.6
Year	52.1	107	−17	34.22	12.71	45.63	33.3

AGRICULTURE.

Agriculture has been one of the leading industries of Allegany County since the early days of its settlement, but because of the mountainous topography, the lack of transportation facilities, and the heavy growth of forest its progress was at first very slow. Even to-day the county exceeds only 2 of the 24 counties of the State in value of agricultural products. The prevailing type of agriculture is general farming, but fruit growing has become an important industry within the last decade, the county standing twelfth in value of fruits and nuts in 1919. Dairying is also practiced rather extensively, though it is not so important as fruit growing. The principal general farm crops are corn, oats, wheat, rye, and forage.

In the last 25 years considerable improvement of farm land has been brought about by crop rotations, the use of lime and commercial fertilizers, and the addition of organic matter by turning under green crops. Owing to the fact that more livestock is now kept, stable manure is used in larger quantities, and this has contributed considerably toward soil improvement.

The general trend of agriculture during the last 40 years is shown by the following tables, compiled from reports of the census. The first table gives the acreage and production of the principal field crops for each of the census years, beginning with 1879; the second gives

the number of bearing trees and the yield of the various fruits for 1889, 1899, 1909, and 1919; and the third gives the value of the principal classes of agricultural products for 1909 and 1919.

The first table shows that there has been a considerable falling off in the acreages of corn, wheat, and rye between 1879 and 1919 and that the acreage of hay and forage crops is about one-third larger now than in the earlier year. On the whole, general farming has not advanced. In the case of fruit growing the picture is somewhat better, there being only 45,690 bearing trees of all kinds in 1889 and 187,387 in 1919. There were in this latter year 204,465 trees of nonbearing age, showing that comparatively recent plantings had been heavy during the preceding decade and that the development of the industry was continuing.

Some idea of the relative importance of the several lines of agricultural endeavor may be gleaned from the third table, showing the value of different classes of agricultural products. The comparison between 1909 and 1919 can not be strictly made because of the effect of season upon yield, especially in the case of the fruits, and also because of the variableness of prices upon which the total values are based. In 1919 the more important products, on the basis of sale value, were, of the crops, cereals, vegetables, hay and forage, and fruits and nuts; and of the animal products, dairy products, poultry and eggs, and animals sold and slaughtered.

Acreage and production of the more important crops of Allegany County in 1879, 1889, 1899, 1909, and 1919.

Crop.	1879		1889		1899		1909		1919	
	Area.	Production.	Area.	Production.	Area.	Production.	Area.	Production.	Area.	Production.
	Acres.	*Bushels*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*	*Acres.*	*Bushels.*
Corn	8,661	206,949	6,513	132,750	8,029	171,530	8,540	190,756	6,846	255,372
Oats	3,772	52,570	3,900	71,769	3,062	64,250	3,384	62,908	4,230	86,703
Wheat	7,549	67,458	5,086	60,111	6,895	73,000	3,889	52,043	4,409	62,092
Rye	2,832	19,165	1,573	14,813	1,595	17,680	1,411	15,926	810	9,921
Buckwheat	1,130	11,368	512	3,811	489	4,860	847	10,977	708	11,396
Potatoes	------	59,304	225	37,182	734	60,962	1,041	98,814	944	88,804
Other vegetables	------	------	------	------	704	------	1,032	------	468	------
		Tons		*Tons.*		*Tons.*		*Tons.*		*Tons.*
Hay and forage	6,868	5,485	8,485	10,076	8,461	9,850	8,973	10,833	9,531	13,683

Number of fruit trees and of bushels harvested in Allegany County in 1889, 1899, 1909, and 1919.

Trees.	1889		1899		1909		1919	
	Number.	Bushels.	Number.	Bushels.	Number.	Bushels.	Number.	Bushels
Apples	35,908	60,082	61,313	81,125	56,459	54,559	101,997	72,991
Peaches and nectarines	5,458	2,151	38,310	1,465	34,670	5,077	71,658	21,658
Pears	1,254	579	3,702	1,398	4,959	841	4,183	1,094
Plums and prunes	1,623	164	6,152	478	6,055	641	4,362	702
Cherries	1,447	573	2,563	1,525	5,772	1,929	5,187	543

Value of agricultural and livestock products of Allegany County, in 1909 and 1919.

Products.	1909	1919
Crops by classes:		
Cereals	$228,694	$650,024
Other grains and seeds	752	4,950
Hay and forage	150,581	309,077
Vegetables	132,500	339,215
Fruits and nuts	50,471	180,541
All other crops	62,514	846
Total	625,512	1,484,653
Animal products:		
Dairy products (exclusive of home use)	139,839	301,554
Poultry and eggs	67,223	213,266
Honey and wax	2,415	3,448
Wool and mohair	2,124	7,005
Domestic animals sold and slaughtered	119,067	[1]159,408
Total	330,668	684,681

[1] Estimated. The census of 1920 does not give this item.

Probably the most promising agricultural industry is fruit growing. There are several commercial orchards in the county which are said to be operating successfully. There are considerable areas of land particularly adapted to fruit growing, which offer opportunity for expansion of the orchard acreage. Apples and peaches are the fruits grown most extensively; the small fruits are grown only on a limited scale. There is apparently a good local demand for the small fruits and opportunity for increased plantings on the soils of the county. The leading varieties of apples are Stayman Winesap, York Imperial, Rome Beauty, Delicious, Grimes, Yellow Transparent, and Jonathan. Some orchards contain other varieties, but the plantings are not on a large scale, as are those mentioned. Among the important varieties of peaches are the Champion, Elberta, Carman, Solway, Belle of Georgia, and Smock.

Grapes, pears, plums, and cherries do well in the county, but are not produced commercially. They are grown on a small scale, chiefly for home consumption.

There are no specialized truck farms in the county. Every farmer produces a small amount of garden vegetables, and in many instances market gardening is carried on as a side issue, the products being disposed of in the local markets.

Dairying is on the increase in the county, and no doubt will become eventually one of the leading industries. Many general farmers produce some milk for market and in some cases butter is sold, but usually in a small way. The 1920 census reports the value of dairy products as $301,554, exclusive of milk and cream used on the farm. The dairy herds are usually small, including from 10 to 20 cows, but there are a few herds of 30 or more animals. The Holstein and Guernsey breeds appear to be the most popular. Practically all the dairy products are disposed of in local markets, the greater part probably at Cumberland. Some shipments are made to Baltimore, but these are usually small. Silos are growing in favor throughout the county, a number of farms now being equipped with them.

The census reports a total of 4,563 hogs in 1919. The number on any one farm is small, but practically every farm has a few. Most hogs raised are for home use, rather than for market. Poultry and eggs, on the basis of value, are produced on a somewhat larger scale than hogs, as shown by the census returns. The receipts from the sale of poultry products for 1919 were $83,112; most of these products are marketed at Cumberland, Frostburg, and Westernport.

Generally speaking, the farm equipment of the county is modern, except that power machinery is not used to any great extent. The work stock consists principally of horses, most of the farming being done with horse-drawn implements. Because of the roughness of a large proportion of the county, tractors can not be used successfully on many farms, but some are being used in the valleys where many of the slopes of the rolling to hilly country are smooth enough for efficient employment of these machines.

At present the principal type of agriculture, as stated, is general farming, and from the statistics quoted it is seen that this has been true for a long time. The bulk of the farm products, with the exception of fruit, is disposed of through the local markets. This is due to the fact that the larger proportion of the population is engaged in nonagricultural industries, creating an excellent demand for farm products. Many farmers combine general farming with dairy farming or fruit growing and grow some vegetables as a side line. Feeding of livestock is not carried on to any great extent.

The crop adaptations of the various soils of the county are recognized in practice in a fairly definite way. The general farm crops are grown largely on the rolling valley lands, while orcharding is more or less confined to the higher lying situations where the soils are considered better adapted to fruit and where the air drainage is better and frost occurrence less erratic. The best apple soils are the Frankstown gravelly silt loam, the Upshur gravelly loam, and the Dekalb gravelly loam. The apples grown on the Frankstown gravelly silt loam are of the finest quality. This soil in Frederick County, Va., and Berkeley County, W. Va., is also noted for the quality of apples it produces. The Frankstown gravelly silt loam is also well adapted to small fruit, the best blackberries of the county coming from this soil. While both peaches and apples are produced on the Dekalb gravelly loam, this type is generally considered as being better suited to peaches. One large peach and apple orchard was seen on the Dekalb shale loam. This orchard is said not to be on a paying basis, but largely because of lack of attention. The indications are that with proper methods peaches can be grown successfully and profitably on this type.

The soils best adapted to the general farm crops are the Hagerstown clay loam, Westmoreland silt loam, Dekalb silt loam, and the soils of the alluvial Pope and Huntington series. The Dekalb stony silt loam is probably best suited for grass and pasture, because it occupies rather hilly areas and also contains considerable stone that hinders cultivation somewhat.

The crop rotation most widely practiced consists of corn one year, wheat two years, and grass two years or more. Sometimes the soil is occupied by grass for only one year, making a four-year rotation. Where commercial fertilizer is used, it is applied to wheat, generally in the form of a complete mixture, at the rate of from 200 to 400

pounds per acre. When stable manure is available, acid phosphate alone is also applied to wheat.

Corn usually follows grass, the sod land generally being plowed to a depth of 6 to 8 inches in the fall and disked and harrowed the following April until a good seed bed is prepared. Planting is done with a 2-row corn planter in rows 40 to 42 inches apart. Corn is cultivated 2 to 4 times with a 1-row walking or sulky cultivator. Where grown for the grain the crop usually is cut by hand and shocked. Most of the corn produced in the lowlands is of the Boone County White and Reid Yellow Dent varieties. On the mountain sides and at the higher altitudes white and yellow varieties with smaller ears are grown.

Wheat is seeded in the fall. When corn is followed by wheat the stubble land is prepared by disking and the seeding is done with a drill. Sometimes the corn land is plowed before seeding to wheat and the seed bed prepared by harrowing and dragging. When wheat follows wheat the land is nearly always plowed. The crop is harvested with a grain binder, shocked, and stacked until threshing time, or removed from the field and put in a grain barn until time to thresh. The leading varieties of bearded wheat grown in the county are Dietz Longberry, Purplestraw, and Miracle, and of the smooth varieties, Fultz, Currell Prolific, and China.

Timothy is sown with the wheat in the fall and red clover is sown broadcast over the grain and grass the following spring. The hay is harvested in the usual way, and most of it stored loose; a little is baled.

The farm buildings of the county are ordinarily of frame construction, with stone houses here and there and a very few brick buildings. The barns are usually large enough to store the general farm crops and to provide shelter for livestock and the farm implements. They are mostly of frame construction, and are generally kept in good repair. No barns of the "bank barn" type were seen in the county.

In 1920 the census reported 544 farms using commercial fertilizers at an average expenditure of $132 per farm. The bulk of the fertilizer used is applied to wheat. A mixture analyzing 2 per cent nitrogen, 8 per cent phosphoric acid, and, in normal times, 2 per cent potash, is applied at the rate of 200 to 400 pounds per acre. In some cases the crop is fertilized with stable manure, supplemented with acid phosphate. Manure also is applied to corn and sometimes to grass land. Considerable lime is used throughout the county, mostly in the form of hydrated lime and burnt lime. There are several local limekilns, the products of which are disposed of in the surrounding territory.

During the last few years farm labor has been rather scarce, because of the high wages paid by commercial industries of the county. However, adjustment has now been made and this has decreased the demand for labor, with a consequent reduction of wages. Farm hands are paid $30 to $35 a month with board and lodging. In harvesting the fruits, day labor is paid on the average about $3 a day with board and lodging. Most of the farm labor is native born, except hands employed in picking and packing peaches and apples, when considerable labor comes from other sources. According to the 1920 census, 539 farms of the county reported an

expenditure of $238,734 for labor in 1919, an average of $443 per farm reporting.

The farms vary in size from a few acres up to 500 acres, the majority including from 50 to 250 acres. A few fruit farms, however, contain 1,000 acres or more. The 1920 census reports the average size of farms as 153.1 acres, of which 64.1 acres is improved land.

According to the census, 78.7 per cent of the farms are operated by the owners, 17.7 per cent by tenants, and 3.6 per cent by managers. Farms are usually rented on the share basis. Ordinarily the owner furnishes half the fertilizer and receives half the produce. A few farms are rented for cash, the average rate of return being about $5 an acre. In either case the tenant furnishes all the work stock and machinery and half the fertilizer.

For purposes of valuation, Allegany County lands may be divided into three classes: (1) Uncleared and unimproved areas; (2) improved fruit lands; (3) improved general farms. The improved fruit lands usually occupy the higher lying areas which are more or less hilly, while the general farms occupy the more rolling areas between the high parallel ridges. The uncleared areas, excluding the timber, sell for about $5 to $15 an acre, the average being about $10. The improved fruit farms in the best fruit sections sell for $150 to $400 an acre, while the general farms are valued at about $40 to $80 an acre. The price depends largely upon location with respect to railroad shipping stations and good highways, topography, and condition of the soil. The 1920 census gives the average assessed value of farm lands as $51.17 an acre.

SOILS.[2]

The soils of Allegany County are light in color; that is, they range from gray to brown in the surface soil and from yellow to brownish yellow in the subsoil. This region was forested until reclaimed for agriculture, and there has been little opportunity for any large accumulation of organic matter in the soils. There is, however, in the wooded areas a noticeable quantity in the upper inch or two of soil, which soon disappears when the land is brought under cultivation. In this region erosion and leaching has kept such close pace with the disintegration and decomposition of the rocks that no lime carbonates have accumulated in either soil or subsoil, although the original rocks from which these soils are derived contain more or less lime. In the case of the Hagerstown, Frankstown, and Westmoreland soils, the parent rocks are limestone or interbedded limestone and shale. As a rule the soils of the county are neutral or slightly acid and respond to the application of lime.

Many of the soils of Allegany County do not present more than two distinct horizons within the 3-foot section. In the Dekalb, Westmoreland, Frankstown, Holston, and Pope series the surface soils are prevailingly grayish brown to brown, and the subsoils are dominantly yellow and have a friable structure. In the wooded areas the first 2 or 3 inches of the surface is darker, owing to the

[2] The soils of Allegany County, Md., do not join those of Bedford County, Pa., which was surveyed in 1911. This failure is due to a better understanding of the soils and to more detailed mapping in the later survey. The Frankstown gravelly silt loam and Hagerstown clay loam of Allegany County adjoin Dekalb stony loam of Bedford County in a few places, whereas the Frankstown gravelly silt loam, the Hagerstown clay loam, and Dekalb stony loam adjoin areas of Frankstown stony loam in Bedford County. Again, the Dekalb shale loam of Allegany County was mapped against Dekalb stony sandy loam and Dekalb silt loam of Bedford County, and the Westmoreland silt loam was mapped against Dekalb shale loam.

presence of small quantities of organic matter. In the case of the Hagerstown and Upshur soils there is very little difference in color between the surface soils and the subsoils, but the subsoils are slightly heavier. The Hagerstown clay loam is the heaviest soil in the county and has the toughest and most compact subsoil. This type and the Upshur soils are the red soils of the area.

One of the noticeable characteristics of the soils of Allegany County is the presence of gravel, platy shale particles, and stone scattered over the surface and distributed throughout the soil section. In many places the broken bedrock comes within 12 to 20 inches of the surface; particularly is this true of the shaly and stony types. It appears that the shallowness of soil material over the rocks is due either to the action of erosion which has carried away the soil as fast as it has been formed, or to the fact that the rocks have withstood the forces of weathering to such an extent that only a thin covering of soil has accumulated.

The soils of the county are of two general groups: Residual soils, formed largely in situ through the disintegration and decomposition of the underlying rocks, and alluvial soils, formed by deposits laid down in flood plains during stream overflow.

The rocks of the region are all sedimentary or metamorphosed sedimentary, and are represented largely by sandstone, shale, quartzite, conglomerate, and limestone. The limestone occupies a smaller area than the other kinds mentioned. Generally speaking, the rocks have weathered into a relatively thin layer of soil, partly decomposed rock frequently outcropping at the surface. The limestone occurs in narrow strips, occupying rather high lying areas near the crest of the mountains. Siliceous limestone is found on the crest of some of the important ridges, and in such situations the soil may consist mainly of limestone gravel with very little fine earth present.

The alluvial soils are composed largely of materials washed from the uplands adjacent to the local streams, none of which rise far beyond the county's boundaries. A few small areas of alluvial soil lie on terraces along some of the larger streams. The alluvial soils of the county are not extensive.

All the soils, with the exception of those accumulated as alluvial and colluvial deposits, are the result of the decomposition and disintegration of the underlying rocks, with such subsequent modification of the material thus formed as the growth and decay of vegetation, the effects of leaching, and other processes of weathering have produced. The character and composition of the original parent rock has had determinative effect upon the character of the derivative soils. The sandstones, for example, are covered by sandy soils or soils containing considerable sand; the noncalcareous shales are covered by very silty soils of markedly uniform character, under the prevailing condition of good drainage, wherever the original shale has been the same or essentially the same; the limestones have given rise to silty soils which are distinct from those of shale origin; and the Indian-red shales have given rise to silty and clayey soils having the same color as the parent rock.

On the slopes, material fallen and washed from above has in many places covered the material derived from the underlying rocks for some distance down the slope, but usually soil derived from the rocks beneath will be found even on the slopes, except where the belts of

such rock are very narrow. Soil formed from such heterogeneous or mixed slope material is considered colluvial soil.

For purposes of classification the soils are grouped into series. This grouping is based upon certain soil characteristics, such as color, character of subsoil, origin, structure, and drainage. The series is separated into types upon the basis of the texture of the surface soil.

The soils formed by weathering of the underlying rocks—that is, residual soils—are grouped in the Dekalb, Frankstown, Hagerstown, Upshur, and Westmoreland series.

The types included in the Dekalb series have light-brown to brown or yellowish-brown surface soils and a yellow to brownish-yellow subsoil. Where derived from shale, the subsoil contains partly decomposed shale fragments, and bedded shale often lies within a few inches of the surface. In the areas derived from sandstone the subsoil contains more or less sand, which gives it a friable character, especially in the lower part. Where the subsoil consists of clay, or silty clay, as it does in places, the structure is usually moderately friable. Six types and two phases, the gravelly loam, shale loam, with a steep phase, silt loam, with a colluvial phase, stony loam, stony sandy loam, and stony silt loam, were mapped.

The types of the Frankstown series are characterized by yellowish-brown to brown or grayish-brown surface soils and a pale-yellow to yellow, open, very friable, well-aerated subsoil. These soils are derived from highly siliceous limestone, calcareous shales, and fine-grained sandstones. So much fragmental whitish chert and sandstone is present that it is impossible to bore to any depth into the subsoil. The drainage is very good. Only one type, the Frankstown gravelly silt loam with a colluvial phase, is mapped.

The types of the Hagerstown series are reddish brown in the surface soil and brownish red to red in the subsoil. The clay subsoil is moderately friable when dry, but a little plastic when wet. Fragments of limestone are scattered over the surface and in some places ledges of limestone outcrop. These soils are derived from thin-bedded blue limestone that runs higher in lime content than that from which the Frankstown series is derived. The drainage is well established, both at the surface and beneath. One type, the Hagerstown clay loam, is mapped.

The Upshur series comprises types with reddish-brown to Indian-red surface soils and an Indian-red friable to moderately stiff clay subsoil. The soil material is derived from thin-bedded Indian-red shale and sandstone. The sandstone is found principally at the base of the slopes and the shale usually occurs on the hillsides and areas of more broken topography. The parent rocks are believed to be somewhat more calcareous than those giving rise to the Dekalb soils—at least these Upshur soils are usually more productive than the Dekalb soils. The Upshur gravelly loam and Upshur shale loam were mapped.

The types of the Westmoreland series are characterized by light-brown to brown surface soils and a yellow to brownish-yellow or reddish-yellow friable subsoil. These soils are derived from materials coming from the rocks of the Niagara formation, which includes thin layers of bluish limestone and black shale. They have good drainage. Only one type of the series, the silt loam, occurs in the county.

The alluvial soils are represented by the Holston, Atkins, Huntington, and Pope series.

The types of the Holston series have light-brown to brown surface soils and a light-brown to yellow moderately friable subsoil. These soils are developed on old-alluvial stream terraces and lie considerably above the first bottoms of streams. Considerable quantities of rounded gravel occur in the surface soil, and the subsoil or substratum contains more or less rounded cobblestones, outcrops of which are seen in places along the lower slopes. The soils are derived from materials washed entirely or very largely from noncalcareous sandstone and shale. One type, the silt loam, was mapped.

The soils of the Atkins series are grayish brown to gray or mottled in the surface layer and mottled gray and yellow in the subsoil, which is apt to be compact in the lower part, especially when dry. At about 36 inches the mottled gray and yellow material occasionally shows streaks of red. These soils are poorly drained and are derived entirely or very largely from materials washed from noncalcareous sandstone and shale upland soils. They occur as first bottoms but have imperfect drainage. Only one type, the Atkins silt loam, is mapped.

The Huntington series comprises types having light-brown to brown surface soils and a light-brown to brownish-yellow friable subsoil. These soils occur in the first bottoms of streams rising in or flowing through limestone areas, and are composed largely of material washed from limestone soils. The drainage between periods of overflow is much better than that of the Atkins soils. One type, the Huntington loam, is mapped.

The Pope series includes types with light-brown to brown surface soils and a light-brown, yellowish-brown, or yellow subsoil, in some places a little reddish, where material from the Upshur soils is present. They are derived from materials washed chiefly or wholly from sandstone and shale soils of a noncalcareous character. These soils occur as narrow strips and are deposited in the first bottoms of streams. Three types, the fine sandy loam, loam, and silt loam, occur in this county.

One miscellaneous type, Rough stony land, represents areas too rough and stony for agricultural use.

In the following pages of this report the various soil types are described in detail and their relation to agriculture is discussed; their location is shown on the accompanying map; and their actual and relative extent is given in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Dekalb shale loam	60,800	26.7	Pope silt loam	5,888	2.2
Steep phase	10,176		Holston silt loam	5,376	2.0
Dekalb stony silt loam	34,240	12.9	Huntington loam	4,928	1.9
Dekalb stony loam	29,568	11.2	Dekalb stony sandy loam	3,712	1.4
Upshur gravelly loam	23,296	8.8	Westmoreland silt loam	3,648	1.4
Dekalb gravelly loam	22,336	8.4	Pope loam	3,392	1.3
Dekalb silt loam	19,072	7.6	Upshur shale loam	2,560	1.0
Colluvial phase	1,088		Pope fine sandy loam	2,496	1.0
Frankstown gravelly silt loam	15,808	6.9	Atkins silt loam	896	.3
Colluvial phase	2,368				
Rough stony land	7,424	2.8	Total	264,960	
Hagerstown clay loam	5,888	2.2			

DEKALB STONY SANDY LOAM.

The surface soil of the Dekalb stony sandy loam is a brownish-yellow to pale-yellow sandy loam about 2 to 4 inches deep, passing abruptly into a yellow or pale-yellow sandy loam, which extends to a depth of 24 to 30 inches. There is an abundance of sandstone and quartzite fragments scattered over the surface, and the subsoil frequently contains enough such material to prevent boring deeper than about 18 inches. About 20 per cent of the surface soil of most of this type consists of medium to large sized stones, largely coarse-grained Oriskany sandstone, the removal of which is necessary before the type can be cultivated.

The Dekalb stony sandy loam is not an extensive type in the county, and most of it is unfit for agriculture. The largest area lies on Bush Ridge, the side of Nicholas Mountain, and the crest of Martin Mountain. One small detached area lies on the crest of Evitts Mountain below the Pennsylvania line. On Martin and Nicholas Mountains the type borders the Frankstown gravelly silt loam, and is slightly influenced by that type which tends to make it heavier in character. Here large quantities of hard whitish chert fragments, together with soft yellowish fragments of partially decomposed siliceous limestone, are scattered over the surface.

The topography of the Dekalb stony sandy loam is rather steep and in places rough. The drainage is rapid. Very little of the type is under cultivation, the cultivated fields being confined to small patches used for producing general crops for home consumption. One thrifty young apple orchard was noted on the crest of Martin Mountain near the border of the Frankstown gravelly silt loam.

Most of the type is occupied by forest, consisting of chestnut, pine, maple, hickory, and dogwood. Huckleberry and blackberry grow in abundance.

Some areas of this soil of smooth topography could probably be cleared and used for general farming, but in view of the fact that the soil material is loose and open in structure and leaching consequently rapid, constant effort would be necessary to keep up the fertility through addition of organic matter and application of slowly soluble fertilizers. For these reasons the land might better be left in forest.

DEKALB STONY LOAM.

The Dekalb stony loam is a light-brown to brownish-yellow or yellow stony silt loam or stony fine sandy loam, underlain at about 4 to 6 inches by yellow stony silty clay or stony silty clay loam, which normally extends to a depth of 24 to 30 inches before the bedrock appears. The stony content consists of sandstone fragments. In the vicinity of Pinto some fine-grained red sandstone occurs and material derived therefrom gives a reddish cast to the surface soil.

The Dekalb stony loam is one of the extensive types in the county, but it is not of very great importance agriculturally. It is well developed on Dans Mountain in the western part of the county and on Collier and Warrior Mountains and Town Hill in the eastern part. It occupies the steeper slopes just above the Dekalb silt loam, colluvial phase, or the Dekalb gravelly loam, and just below Rough stony land. Where the last does not occur the Dekalb stony loam occupies the crest of the ridges.

Most of this type is forested with white oak, black oak, hickory, chestnut, and some black locust and pine. Very little of this soil is under cultivation, although in places the stone has been removed from small patches on the lower slopes. In such places fruit is grown and does well. Owing to the steepness of the slopes and its stony character, this type is not adapted to general farming. It is valuable forest land and should be used for forestry. Land of this type, exclusive of the timber, ranges in price from $5 to $15 an acre.

DEKALB STONY SILT LOAM.

The Dekalb stony silt loam consists of a brownish-yellow to yellowish-brown silt loam, 8 to 10 inches deep, overlying yellow friable silty clay. Scattered over the surface and disseminated through the soil and subsoil are many small sandstone fragments and shale chips. Large fragments of sandstone also occur on the surface and throughout the soil and subsoil. These interfere seriously with cultivation.

The Dekalb stony silt loam is a relatively important type on account of its extent, but it is not so important as a farming type because of its unfavorable topography and stoniness. It is typically developed in the Georges Creek Valley, the eastern slope of Savage Mountain, and west side of Dans Mountain. Some small areas on Dans Mountain are so rough as to warrant their classification as Rough stony land, but owing to their small size they have been included with this type. Quite a large area of this type is mapped in the vicinity of Mount Savage.

The topography of the Dekalb stony silt loam is rather steep and locally it is quite rough. The drainage is rapid, and under cultivation much of the surface soil probably would be washed away. The type is considerably heavier than some of the members of the Dekalb series in the county, consequently less loss would result from leaching in areas under cultivation. A large part of this type is forested, maple and oak being the principal trees. Where cultivated it is usually farmed in conjunction with the Dekalb silt loam. Except for its stoniness and steeper topography, it is practically the same as the Dekalb silt loam.

The Dekalb stony silt loam is probably best suited for use as pasture and forest land. Grass and clover do well on the cleared areas. It is possible that fruit growing and dairying could be carried on to some extent upon the smoother areas. Land of this type ranges in price from $15 to $25 an acre, depending largely upon location with respect to improved highways and shipping points, and upon the character of the improvements.

DEKALB GRAVELLY LOAM.

The surface soil of the Dekalb gravelly loam is a grayish-brown to light-brown loam 6 to 8 inches deep. In forested areas the surface layer, 2 or 3 inches thick, is brown to grayish-brown, but below this the color is almost yellow. The subsoil to a depth of 3 feet or more, or to bedrock, is a friable, yellow, pale-yellow, or brownish-yellow gravelly loam or gravelly fine sandy loam. There is an abundance of angular sandstone gravel, together with fragments of quartzite and shale, throughout the soil and subsoil. In most places the quantity of such coarse material is sufficient to interfere to some extent with

cultivation. There are, however, included spots that contain but little gravel and have a grayish surface soil. Areas of this kind lie adjacent to Sideling Hill Creek and the Potomac River in the vicinity of Bellegrove and Little Orleans.

This is a rather extensive and important agricultural soil. Most of it is in the eastern part of the county, small areas being mapped on the eastern slope of Dans and Piney Mountains, and on Colliers, Nicholas, Warrior, and Martin Mountains. In many places it occupies the lower slopes, with the Dekalb stony loam just above it. The drainage is good, and in many places excessive.

A large part of the type is in forest, not more than 15 per cent being under cultivation. The principal forest growth consists of oak, chestnut, maple, dogwood, and some pine.

Where cultivated the type is used largely for general farming. Fruit is grown in a small way, but there are few specialized fruit farms located on this soil. Peaches and apples are produced successfully and some small fruit is grown. This soil is very well suited to peaches. The general farm crops are corn, wheat, and grass. Fair yields of corn and wheat are obtained, and grass yields one-half to 1 ton of hay per acre. The moderate yields of corn and wheat are due for the most part to improper handling of the soil, which, on account of the steep slopes, results in rather excessive erosion. As a rule the type is naturally better suited to fruit growing than to general farming.

This type is low in organic matter and would be materially benefited by the addition of stable manure and by turning under green-manure crops. Clover was seen growing on the type in many places, and the introduction of this crop into the rotation should be encouraged for the purpose of building up the soil.

Land of this type brings from $10 to $50 an acre, depending largely upon the location, topography, and character of the improvements.

The Maryland Agricultural Experiment Station has conducted plot experiments for a period of three years on the Dekalb gravelly loam in the adjoining county, Garrett. The rotation practiced on these plots is oats, clover, and potatoes. The plots are in duplicate, one series being on old land and the other on recently cleared land. In this rotation all fertilizers and manures are applied to the potatoes, the oats and grass being benefited by the residual effects.

The following table gives the yield of the three crops for the period of one rotation:

Results of 3-year fertilizer tests with potatoes, oats, and clover on the Dekalb gravelly loam.

[Yields per acre.]

Plot treatment, per acre per rotation.	Range 1 (old land).			Range 2 (new land).		
	Potatoes.	Oats.	Hay.	Potatoes.	Oats.	Hay.
	Bushels.	*Bushels.*	*Tons.*	*Bushels.*	*Bushels.*	*Tons.*
Check, no treatment	153	52	2.1	150	51	2.0
Complete fertilizer, 800 pounds	185	45	2.4	190	63	1.6
Nitrate of soda, 100 pounds, and acid phosphate, 700 pounds	189	54	2.7	172	64	2.2
Manure, 15 tons, and acid phosphate, 750 pounds	200	51	2.6	192	62	2.5
Raw rock phosphate, 2,000 pounds	182	53	2.9	187	54	2.7
Acid phosphate, 1,000 pounds	177	55	2.7	197	62	2.4

It is seen that the manure, 15 tons per acre, and acid phosphate, 750 pounds per acre, gave the highest yield of potatoes on the old land, while on the new land the yield was 8 bushels less than on the old, but 42 bushels higher than on the check plot. One treatment on the new land, acid phosphate, 1,000 pounds per acre, yielded higher than the manure and acid phosphate. With respect to the residual effect, the largest yield of oats was obtained from the plot that received 1,000 pounds of acid phosphate on the old land, while on the new land the plot receiving 100 pounds of nitrate of soda and 700 pounds of acid phosphate gave the highest yield of oats.

It appears that this type responds to treatment with nitrogen and phosphorus, and, from the figures quoted in the table, that the best results are obtained with this rotation from the use of the combination of manure and acid phosphate. The tests have not continued long enough, however, to serve as a basis for very definite conclusions.

Results with heavy applications of lime and the liberal use of stable manure on certain plots in these Garrett County tests indicate that the use of these materials do not necessarily encourage the development of scab in potatoes if care is taken to treat the seed.

DEKALB SHALE LOAM.

The surface soil of the Dekalb shale loam is a light-brown to brown shaly silt loam, 4 to 6 inches deep. The subsoil consists of a mixture of partly decomposed shale fragments and a yellowish silty material of heavy silt loam to silty clay loam texture, which rarely extends deeper than 20 inches. The bedrock shale, which has a reddish or yellowish-red color, is encountered below this depth. A large quantity of angular shale chips is distributed throughout both the surface soil and subsoil, and usually makes it difficult to bore to a depth greater than 12 inches.

The Dekalb shale loam is an extensive type and is considered relatively important agriculturally. It has its greatest development on the east slope of Polish Mountain, west slope of Town Hill, and in an area east and south of Warrior Mountain. The surface of the type is hilly to steep. The drainage is good to excessive. Erosion has removed the soil in many places in the cultivated fields, leaving the partly decomposed shale bedrock exposed. Terracing is practiced in a few instances on the steeper slopes, and this practice should be more generally followed, especially on the steeper slopes.

A considerable part of this type is under cultivation, largely in orchards. General farm crops are grown, but owing to the loss of soil by erosion where intertilled crops are produced this type of agriculture has not always been the most profitable. Corn yields from 15 to 30 bushels, wheat 10 to 20 bushels, and hay about one-half ton per acre. Apples and peaches do well; the type probably is better adapted to peaches than apples.

The Dekalb shale loam, like the Dekalb gravelly loam, is low in organic matter, and the addition of stable manure and the turning under of green-manure crops would materially increase its productiveness. Deep plowing also should be practiced with a view to deepening the root zone and forming a larger reservoir for water, thus reducing the run-off. Such methods, together with terracing, would do much toward keeping in check erosion, which is excessive and

destructive. On account of the character of the soil and the steepness of the slopes, this soil is better adapted for orchard sites and pasture land than for growing the general farm crops. The steepest areas and those where bedrock lies near the surface should be devoted to forestry.

Dekalb shale loam, steep phase.—The steep phase of the Dekalb shale loam is identical in soil characteristics with the typical Dekalb shale loam. It is separated on the basis of topography and includes those areas where the slope is so steep as to preclude any agricultural use. Practically the whole area occupied by this phase is in forest. In such areas the brownish surface soil is rarely more than 3 inches deep, and this is underlain by partly decomposed shale fragments and yellowish silt loam or silty clay loam. The phase occupies very steep slopes on the west side of Polish Mountain and on the west side of Town Hill near its southern extremity. This phase should be used only as forest and pasture land. Land of this type, exclusive of the timber, at present ranges in price from $5 to $10 an acre.

DEKALB SILT LOAM.

The surface soil of the Dekalb silt loam is a light-brown to brownish-yellow or grayish-brown silt loam, 8 to 10 inches deep. In forested areas the surface 3 or 4 inches is grayish to brownish in color, but below this the color is pale yellow to yellow. The subsoil to a depth of 24 to 30 inches is a pale-yellow to yellow or brownish-yellow moderately friable silty clay loam to silty clay.

This type occupies the more rolling country just above the areas of Dekalb stony silt loam. Considerable quantities of shale and sandstone fragments are distributed over the surface, but these fragments are not present in sufficient quantity to make the soil a shale or gravelly loam, and where large stones occur they can be removed so as not to interfere seriously with cultivation. The more gravelly areas are indicated on the map by gravel symbols.

This is a rather extensive and important type of soil. Practically all of it lies on the eastern slope of Savage Mountain and on the western slope of Dans Mountain. Two small detached areas were mapped in the eastern part of the county, one near Patterson Depot, the other near Oldtown. A small included area of Dekalb loam occurs along the turnpike near Frostburg and another near Vale Summit. These spots would have been separated and mapped as Dekalb loam had their size warranted it.

A considerable proportion of this type is used for general farming, little fruit being grown except for home consumption. Corn, wheat, and grass are the principal farm crops. Oats do well, but are not grown extensively. Corn yields from 20 to 30 bushels, wheat 15 to 20 bushels, and grass from three-fourths to 1 ton of hay per acre. The position of this soil would lead one to think that considerable damage from erosion would follow cultivation, but where handled properly the fields do not wash badly. Usually the gently rolling lands are devoted to general farm crops and the steeper slopes when cleared are kept in pasture. Many steep slopes are forested, the growth consisting largely of oak and pine.

The content of organic matter is rather high, largely because of the slight loss of surface soil by erosion. The type readily responds to im-

provement and, unlike the lighter members of the series, retains the improvement over a considerable period of time. Stable manure usually is applied to the corn crop, and on most of the farms organic matter is also supplied by turning under green-manure crops. Legumes are not grown on the type extensively, but some good fields of clover were observed. Legumes should be included more generally in the rotations. Land of this type ranges in price from $30 to $45 an acre, according to location, topography, and improvements.

Dekalb silt loam, colluvial phase.—The colluvial phase consists of yellowish-brown to brown silt loam, 6 to 8 inches deep, underlain by pale-yellow to yellow friable silty clay or silty clay loam. Considerable quantities of quartzite and sandstone fragments are scattered over the surface, but such coarse material is not abundant enough to give a gravelly type. Some stones occur in the surface soil, but when these are removed such areas become good farm land.

This phase is not extensive, but it is of about the same importance as the silt loam as a producing soil. It occurs as relatively narrow strips along the lower slope of areas of Dekalb stony loam and is made up of material accumulated by falling and washing down from the adjacent higher slopes. It was mapped in rather small areas on the east and west sides of Wills Mountain, also on the south of Jennings Run, where that stream flows between Dans and Little Allegheny Mountains. The price of land of this phase closely approximates that of the typical soil.

FRANKSTOWN GRAVELLY SILT LOAM.

The Frankstown gravelly silt loam is a yellowish-brown to brownish-yellow gravelly silt loam, underlain at about 4 to 6 inches by pale-yellow to yellow very gravelly loam, silt loam, or silty clay loam. In forested areas only the surface inch or two is brownish-yellow or yellowish-brown, the material below this being pale yellow or yellow. In places the immediate surface soil consists of gravelly silty clay loam. Locally the subsoil shows streaks consisting of material of a pinkish or reddish cast. Whitish and yellowish angular chert and sandstone fragments are present over the surface and throughout the soil in quantities sufficient to interfere to some extent with cultivation. Cultivated fields at some distance have a conspicuous whitish appearance, owing to the abundance of these light-colored rock fragments. It is almost impossible to bore to any considerable depth with the soil auger on account of the high gravel content. This soil has been formed through the weathering of sandstone and highly siliceous limestone.

The area just northeast of Allegany Grove consists of yellowish-brown gravelly loam or gravelly silt loam, which grades beneath into yellow gravelly silty clay loam to silty clay. Here both the soil and subsoil contain very large quantities of yellowish and grayish angular fragments of rock which have the appearance of chert, and of softer weathered rock resembling weathered calcareous sandstone somewhat similar to the so-called "soapstone" rock of Apple Pie Ridge in Berkeley County, W. Va., and Frederick County, Va. The soil has a browner color along the lower parts of the slopes than higher up the slopes.

There are some spots of Frankstown shale loam included with the Frankstown gravelly silt loam. The largest of these patches lies on the crest of Warrior Mountain near its southern extremity, and another on the crest of Martin Mountain about 2½ miles below the Pennsylvania line. These spots of Frankstown shale loam would have been mapped separately had their size warranted it.

This type is not a very extensive one, but it is very valuable agriculturally. It occurs mainly in narrow strips following the ridges. The largest areas are mapped on the crest of Warrior and Nicholas Mountains, where the type is typically developed. Other narrow strips are shown on Collier, Martin, and Wills Mountains and Shriver Ridge.

The Frankstown gravelly silt loam occupies hilly country, the hills having smooth slopes and rounded outlines. The drainage is thorough, but the soil retains moisture very well considering its porosity. Rainfall is absorbed so readily by this open gravelly type of soil that there has been very little erosion in the cleared fields, and on account of its very high absorptive capacity exceptionally steep slopes can be cultivated without much danger of erosion.

A considerable part of the type is occupied by forest consisting of white oak, chestnut oak, and other oaks, maple, hickory, elm, ash, dogwood, and basswood. Fair crops of corn, oats, and potatoes are produced. Potatoes should give particularly good returns, especially where the fields are well fertilized. Rye does well. Probably the greatest agricultural value of the type lies in its peculiar adaptation to apples. One large, thrifty apple orchard of bearing age is located on this type on Warrior Mountain near Oldtown. The location of this soil is such that it has the good air drainage necessary for successful use as a fruit soil. Some of the successful orchards of the eastern United States have been established on soil of this kind in Berkeley County, W. Va., and Frederick County, Va. Small fruit does exceptionally well, blackberries producing from 10,000 to 12,000 quarts per acre without the use of fertilizer.

Land prices vary from $10 to $15 an acre for the uncleared areas and from $400 to $600 an acre for developed orchards.

Frankstown gravelly silt loam, colluvial phase.—The colluvial phase is much like the typical Frankstown gravelly silt loam. The surface soil is somewhat browner than in the typical soil and the gravel consists largely of small fragments of grayish and yellowish chert. The subsoil is a yellow gravelly silty clay loam to silty clay. There is considerably less of the weathered calcareous sandstone fragments on the surface than on the typical soil.

The colluvial phase of the Frankstown gravelly silt loam is unimportant because of its small extent. It occupies lower slopes adjacent to the high lying steeper slopes of the typical soil. It is mapped on the west side of Nicholas Mountain, on the west side of Wills Mountain, and in a few other places. This phase has the same crop adaptations, being well suited to fruit growing, as the typical Frankstown gravelly silt loam, although it is handled with less difficulty than the latter because of its less steep topography.

On the east side of Shriver Ridge and on the west side of Wills Mountain a few spots of Frankstown silt loam were included with this phase on account of their small extent.

HAGERSTOWN CLAY LOAM.

The Hagerstown clay loam is a brown to reddish-brown clay loam, underlain at depths ranging from 2 or 3 inches to about 10 inches by moderately stiff brownish-red clay, which is somewhat plastic when wet. Scattering fragments of thin-bedded limestone and shaly limestone are present on the surface. The more stony areas are indicated on the soil map by stone symbols.

This type is of relatively small extent, but it is one of the strongest and best soils in the uplands of the county. It occurs in rather narrow strips near the crest of Warrior, Martin, and Nicholas Mountains and on the more gentle slopes of Wills Mountain and Shriver Ridge. Where it borders on the Frankstown gravelly silt loam the latter occupies the higher elevation. Small areas of Hagerstown clay are included with the clay loam. These would have been mapped separately had their size been sufficient to warrant it. The largest area of Hagerstown clay lies about 2 miles east of Wolfe Mill.

The topography of the Hagerstown clay loam is strongly rolling to hilly. On the steeper slopes the run-off is rapid, causing serious loss of the surface soil by erosion. In places erosion has removed so much of the soil that bedrock lies within a few inches of the surface.

Where the type is forested the growth consists largely of maple, butternut, black locust, and some walnut. The rolling areas of this soil are used for general farming, corn, wheat, and grass succeeding well where erosion has not been too severe.

The Hagerstown clay loam, while one of the strongest soils of the county, is rather difficult to handle unless plowed under optimum moisture conditions. If plowed when too wet there is danger of puddling and subsequent clodding, and if plowed when too dry clods are formed which are difficult to reduce. The addition of lime, incorporation of organic matter by turning under green-manure crops, and application of stable manure would improve the structure and materially increase the yields. The steeper slopes should be left in forest, or, if cleared, they should either be used for pastures or well terraced under cultivation.

UPSHUR GRAVELLY LOAM.

The surface soil of the Upshur gravelly loam is an Indian-red gravelly loam, 6 to 8 inches deep, and the subsoil is an Indian-red or light Indian-red gravelly clay loam, which rarely extends to depths greater than 20 inches. Below this appears the parent shale or fine-grained sandstone, and fragments of these rocks occur on the surface and throughout the soil and subsoil. As a rule there is not enough of this coarse material to interfere with cultivation.

This type as mapped includes some small patches of Dekalb gravelly loam. These lie principally on Piney Ridge and on the slopes above Mudlick Hollow, though numerous smaller spots occur throughout the type.

The Upshur gravelly loam is confined almost entirely to the eastern part of the county. It is developed on the east and west sides of Town Hill and in a relatively narrow strip near the crest of Dans and Little Allegheny Mountains. A few stone fragments occur on the upper slopes, these having fallen from the stony slopes above. North of Jennings Run on Little Allegheny Mountain the type as mapped is

rather stony. On account of the comparative smallness of the area and the fact that most of the stone could be removed, this stony area was included with the gravelly loam, stone symbols being used to distinguish it from the more typical soil. The topography is rolling to hilly.

Erosion is excessive over much of the cultivated land of this type. There are many areas of rather shallow soil, and in some places the bedrock has been exposed.

Probably 30 per cent of the type is under cultivation; the rest supports a forest growth consisting chiefly of white oak, chestnut oak, chestnut, and some pine. General farming is the prevailing type of agriculture, the principal crops being corn, rye, wheat, and grass. Corn yields about 15 to 25 bushels, wheat 10 to 15 bushels, rye 10 to 20 bushels, and hay one-half to three-fourths ton per acre. The type, however, is better adapted to fruit growing than to general farming. Apples and especially peaches do well.

The Upshur gravelly loam is low in organic matter, owing to a combination of original forest cover and the loss of this important constituent through erosion. Deep plowing and the incorporation of organic matter in the form of stable manure and green manure should be practiced to build up the productiveness of the type. The smooth areas probably should be set to fruit and the hilly regions used for pasture or left in forest. Land of this type ranges in price from about $15 to $50 an acre.

UPSHUR SHALE LOAM.

The surface soil of the Upshur shale loam consists of an Indian-red shaly silt loam, 4 to 6 inches deep, overlying Indian-red silty clay loam. Numerous fragments of the parent shale rock appear on the surface and throughout the soil and subsoil. Some sandstone gravel also is present.

Included with this type as mapped are small patches of Dekalb shale loam and also a few patches of Dekalb gravelly loam. These occur north of Piney Grove, between this place and the Pennsylvania State line. They were not separated because of their small size.

The Upshur shale loam occupies country of milder relief than the Upshur gravelly loam, consequently the run-off is less rapid and erosion less destructive. Normally the soil material is shallow, the bedrock lying within 15 to 20 inches of the surface, and outcropping on the steeper slopes near the contacts with the gravelly loam areas. A larger proportion of the shale loam is under cultivation than of the gravelly loam, chiefly because the latter occupies steeper slopes.

This type is not very extensive, most of it occurring in the vicinity of Piney Grove. One rather large area lies on the east side of Piney Ridge. General farm crops, as well as fruit, are grown on this soil. Apples and peaches, especially peaches, do well on the type. The physical properties of this type are much like those of the Upshur gravelly loam, and the farm practices are practically the same on the two types.

WESTMORELAND SILT LOAM.

The surface soil of the Westmoreland silt loam is a light-brown to brown silt loam, grading at 6 to 8 inches into yellow or brownish-yellow silty clay loam, and this passing abruptly into a moderately friable yellow silty clay, the color in places ranging to reddish yellow.

The lower subsoil also is friable in places and not uncommonly reddish, which is not representative of true Westmoreland. Considerable quantities of shale fragments appear on the surface and in the subsoil, but the admixture of coarse material is not sufficient to give a shale loam. The soil is derived from thin-bedded limestone and shale, the latter having a black color.

Included with this type as mapped are small patches of Frankstown silt loam, the more typical of which lie about 3½ miles northwest of Twiggtown. In the vicinity of Flint Stone a few small spots of Frankstown shale loam also are included. These spots of Frankstown soils are widely separated and so small as to make it impracticable to show them on a map of the scale used in this survey.

The Westmoreland silt loam is not an extensive type, but it is relatively important from the point of view of agriculture. It occurs on the lower slopes on the east and west sides of Martin Mountain, adjacent to the Frankstown or Hagerstown soils. Some limestone fragments occur on the surface, and occasional outcrops of the bedrock appear. The topography is rolling to hilly, and the drainage is good to excessive.

A large part of this soil is under cultivation, the prevailing type of agriculture being general farming. Corn, oats, grass, clover, and alfalfa are successfully grown. The soil seems adapted to orchard fruits. Apples apparently do exceptionally well, although they are not grown in commercial quantities. The yield of alfalfa is from one-half to 1 ton per cutting per acre; the other crops yield about the same as on the Upshur gravelly loam. The forest growth consists of ash, oak, hickory, elm, and black locust.

The content of organic matter is rather low, and the type may be materially benefited by applications of stable manure and by turning under green crops, such as cowpeas or buckwheat. The problem of maintaining productiveness should not be difficult because of the adaptation of the type to legumes. Terracing to prevent erosion should be practiced on the steeper slopes.

Land of this type ranges in price from $30 to $50 an acre, according to location, topography, and farm improvements.

HOLSTON SILT LOAM.

The surface soil of the Holston silt loam is a brown or light-brown silt loam, 6 to 12 inches deep. The subsoil is a brownish-yellow or yellow silty clay loam to silty clay, which in most areas extends to depths greater than 3 feet. In some areas mottling of reddish yellow and gray appears in the lower part of the 3-foot section. Varying quantities of rounded waterworn gravel occur on the surface and to some extent in the subsoil, and in places large cobblestones also occur on the surface, such areas being indicated on the map by stone symbols.

Small included areas with a light-brown to brown surface soil and a pale-yellow subsoil, representing the Elk silt loam, occupying a terrace position, occur along streams flowing through the limestone regions. As these areas are small and are not numerous, they were included with the Holston. One small area of marshy land, about 4½ miles southeast of Cumberland, also has been included. It lies at too high a level to be grouped with the first bottoms and is too small to map separately.

The Holston silt loam occupies stream terraces lying between the first bottoms composed of soils of the Pope series and the uplands. It is derived wholly or very largely from materials washed from areas of sandstone and shale. The included areas of Elk silt loam, which are more productive, have an admixture of limestone material.

The Holston silt loam is small in extent but is a good farming soil. It lies almost entirely along the Potomac River, southeast and southwest of Cumberland. One rather large area is mapped along Sideling Hill Creek about 5 miles south of Bellegrove. It has a gently rolling surface and is well drained.

Practically all of this type is under cultivation. General farming is practiced, with corn, wheat, and grass as the principal crops. Fruit for home use is also produced. In favorable years corn yields from 20 to 40 bushels, wheat 15 to 30 bushels, and hay a ton or more per acre. The soil responds to good management, and, because of its favorable location and physical properties, little loss of fertility occurs either through erosion or leaching.

ATKINS SILT LOAM.

The Atkins silt loam consists of grayish-brown or mottled grayish and brownish silt loam, 8 to 10 inches deep, underlain by mottled gray and yellow or gray and reddish-yellow rather plastic silty clay. The reddish-yellow mottling normally occurs at depths of about 3 feet below the surface. Some included patches have a brown or light-brown surface soil. This type is poorly drained and is derived entirely or largely from material washed down from upland soils of sandstone and shale origin.

Some included spots of fairly well drained brown soil represent areas of Pope silt loam too small to map.

The Atkins silt loam occupies first bottoms along streams arising in or flowing through sandstone and shale regions. The type is small in extent; it lies almost wholly in the southeastern part of the county along streams flowing into the Potomac. It has a flat topography, and the water table frequently stands but little below the surface.

Very little of this type is under cultivation, and on account of the poor drainage, considerable difficulty will be experienced in farming it. The soil puddles and bakes if plowed when too wet and forms clods if plowed when too dry. The land in farms is commonly kept in permanent pasture.

HUNTINGTON LOAM.

The surface soil of the Huntington loam is a light-brown to brown rather silty loam or loam, 6 to 12 inches deep. The soil grades into light-brown to brownish-yellow friable silty clay loam, which becomes heavier with increase in depth and approximates a clay loam in the lower subsoil. The color also changes with depth, being lighter in the lower part. As a rule the soil section is deeper than 3 feet.

Included with the loam are small areas of Huntington silt loam. These lie along Wills Creek. They were not separated on the map because of their small extent.

The Huntington loam occupies first bottoms along streams rising in or flowing through limestone sections and is derived from material washed largely or to a considerable extent from limestone soils. It

is subject to occasional overflow, which makes it less dependable for cultivated crops. Between overflows the drainage of the type is good.

This type lies along the streams flowing through the central and east-central parts of the county. It is mapped along Wills, Evitts, and Town Creeks and their tributaries. The areas occur as narrow strips and are of small extent.

Most of the type is under cultivation, corn, wheat, and grass being the principal crops. A few patches of alfalfa seen during the survey were doing well. Local spots of imperfect drainage are in permanent pasture.

The organic content of the Huntington loam is moderately high. The surface is flat to only faintly undulating or hummocky, consequently there is little or no loss from erosion. The type readily responds to applications of fertilizers and, because of its favorable position, which reduces leaching to a minimum, is easily maintained in a good state of productiveness. Deposition of fresh materials by overflows aid greatly in keeping the soil enriched.

POPE FINE SANDY LOAM.

The surface soil of the Pope fine sandy loam is a light-brown to brown or dark-brown fine sandy loam, 6 to 12 inches deep. The subsoil is a light-brown or yellowish-brown fine sandy loam extending to a depth of 3 feet or more.

This is not an extensive type, but is one of the most productive soils in the county. The surface is flat to faintly undulating or hummocky and the drainage is excellent. The content of organic matter is moderately high, giving the soil a dark-brown color in some areas. The type occupies first bottoms, principally along the Potomac River, and is derived from materials washed chiefly from areas of sandstone and shale.

Nearly all of the Pope fine sandy loam is used for the production of the general farm crops. Corn, wheat, and grass do well. Corn yields from 30 to 45 bushels in the best years, wheat 15 to 20 bushels, and hay 1 to 1½ tons per acre. One field of alfalfa was observed, and judging from this field it would appear that the type is well adapted to the crop.

This is a valuable soil, but because of its small extent it is sold with the surrounding types at prices ranging from $30 to $50 an acre.

POPE LOAM.

The surface soil of the Pope loam is a brown to dark-brown loam, 6 to 8 inches deep, and the subsoil is a light-brown to yellowish loam to a depth of 24 to 36 inches. Considerable quantities of rounded gravel, cobblestones, and in some places large bowlders, composed mainly of sandstone, are scattered over the surface and mixed through the soil and subsoil.

Included with the Pope loam are small narrow strips of Indian-red loam, which are derived in part from materials washed from the Upshur soils. One of these strips lies along Braddock Run near Allegany Grove.

On account of its small extent the Pope loam is an unimportant soil. It occupies first bottoms of streams flowing through areas of sandstone and shale origin. The type is mapped along Jennings Run,

Georges Creek, and Braddock Run in the western part of the county. These streams have shallow channels, their currents are swift, and their bottoms are subject to frequent overflow.

Very little of the Pope loam is under cultivation. Most of it is in pasture, chiefly bluegrass.

POPE SILT LOAM.

The Pope silt loam consists of a light-brown or brown silt loam, 6 to 12 inches deep, underlain by a yellowish-brown silty clay loam extending to a depth of 36 inches or more. The lower subsoil, near the 3-foot depth, in places contains streaks of reddish material.

The Pope silt loam covers a small total area. It occupies first bottoms of streams flowing through sandstone and shale areas, in which the soils are largely of the Dekalb series. The largest areas of this type are mapped in oxbows along the Potomac River. Other narrow strips occur along Fifteenmile Creek and some of its small tributaries. The areas of this soil along the Potomac are relatively high, and consequently are not overflowed as frequently as those along the other streams. A narrow strip of Moshannon silt loam (an Indian-red alluvial soil influenced by material washed from the Upshur) is developed between McCool and Westernport. It is mapped in the same color as the Pope silt loam.

The Pope silt loam has a flat surface sloping slightly toward the stream. Only a few spots are poorly drained. In some places along bluffs the surface slopes from the stream toward the upland, and sufficient water seeps from the bluffs to keep the soil more or less wet, such areas include soil approaching the characteristics of the Atkins silt loam.

The Pope silt loam is heavier than the fine sandy loam and is more difficult to keep in good physical condition, unless care is taken to handle it when the moisture conditions are most favorable. Incorporation of organic matter in the form of stable manure and green manures would do much to improve the tilth of the soil, as well as to maintain its productiveness.

Practically all the Pope silt loam is under cultivation or in pasture. It is particularly well adapted to corn and grass, and only its small extent prevents it from ranking among the leading soils of the county.

Land of this type, when sold with surrounding soils, ranges in price from $20 to $35 an acre.

ROUGH STONY LAND.

Rough stony land comprises rough, broken, and steep areas strewn with rock fragments and cut by rock outcrops. It is unsuited for agriculture. The areas of this land are confined almost entirely to the western part of the county, large areas lying on the crests of Dans and Wills Mountains. The rock consists largely of quartzite and conglomerate. A small area occurs in the south-central part of the county on the slope west of Frog Hollow. A large part of this land supports a forest growth consisting of oak, chestnut, hickory, and some pine, and it is valued principally for the timber. Some areas are pastured.

SUMMARY.

Allegany County is the central of three mountainous counties of western Maryland, lying between the Pennsylvania line and the Potomac River. The area surveyed covers 414 square miles, or 264,960 acres.

The topography is strongly rolling to mountainous. The elevation ranges from 600 to 2,898 feet above sea level, the greater proportion of the county lying between 900 and 1,200 feet above sea level. All the drainage flows into the Potomac River.

Allegany County has a population of 69,938, of which 39,831 is classed as urban and 30,107 as rural. Cumberland, the county seat and the second largest city of the State, has a population of 29,837. The other principal towns of the county are Frostburg, Westernport, Lonaconing, Midland, and Barton.

Transportation facilities of the county are good. An excellent highway extends across the northern part, with moderately good earth roads throughout.

The farm products are largely consumed locally. Cumberland is the principal local market. Some products are reshipped to other markets. Considerable produce also is marketed in Frostburg and Westernport.

The climate is temperate and healthful. The mean annual temperature at Cumberland is 52.6° F. and the mean annual precipitation is 35.11 inches. The average growing season is 191 days.

The agriculture of the county consists in the production of the general farm crops, principally corn, oats, wheat, rye, and forage. Market gardening is practiced as a side line. Fruit growing is well established in the county and is fast becoming an important industry.

Crop rotations are used in a fairly systematic way. Lime and fertilizers are usually applied to the land, especially for corn and wheat. Stable manure is applied rather freely, most of it on corn land.

The farms range in size from a few acres up to 500 acres, although some commercial fruit farms contain as much as 1,000 acres. The average size of farms is 153.1 acres. The price of land ranges from $20 an acre for general farming land up to $400 an acre for bearing orchards.

Allegany County lies in the Appalachian Valley region, with approximately the western one-fifth in the plateau district and the remaining four-fifths in the ridge district.

The residual soils, formed from materials derived through the decomposition and disintegration of sandstone, shale, quartzite, conglomerate, and limestone, are correlated with the Dekalb, Frankstown, Hagerstown, Upshur, and Westmoreland series. The alluvial soils, formed from materials washed from the uplands and deposited along the stream courses, are grouped in the Holston, Atkins, Huntington, and Pope series.

Nine series of soils, represented by 17 types and 3 phases, and one miscellaneous classification, Rough stony land, are mapped

The Dekalb soils are by far the most extensive in the county. These soils are not particularly well adapted to general farming. The stony loam is steep and where cleared is best kept in grass.

Good fruit is grown on the gravelly loam; some of the best peaches produced in the county come from this type. The gravelly loam also gives larger yields of the ordinary farm crops than the shale loam. The silt loam is heavier and is better adapted to farm crops than any of the other Dekalb soils.

The Frankstown soils are not well adapted to general farm crops because of their position, but good yields are obtained where cultivated. The soils are best adapted to fruit, especially apples.

The Hagerstown clay loam is derived from limestone. In this county the soil is of small extent and stony, which prevents it from being one of the leading soils. Good yields of the general farm crops are obtained.

The Upshur soils are only moderately productive for ordinary farm crops. They are somewhat better adapted to the production of fruit.

The Westmoreland silt loam, which is developed on material derived from interbedded limestone and shale, is a good general farming soil. It has a relatively small area in the county.

The Holston silt loam occupies terraces or second bottoms, is well drained, and adapted to general farming.

The Atkins silt loam is a poorly drained first-bottom soil in sandstone and shale regions. It is of small extent and best adapted to pasturage.

The Pope soils are first-bottom types of small extent. They are adapted to general farm crops, and the fine sandy loam seems well suited to the growing of alfalfa.

The Huntington loam occupies first bottoms in limestone regions. This soil produces good yields of corn and grass, and alfalfa does well.

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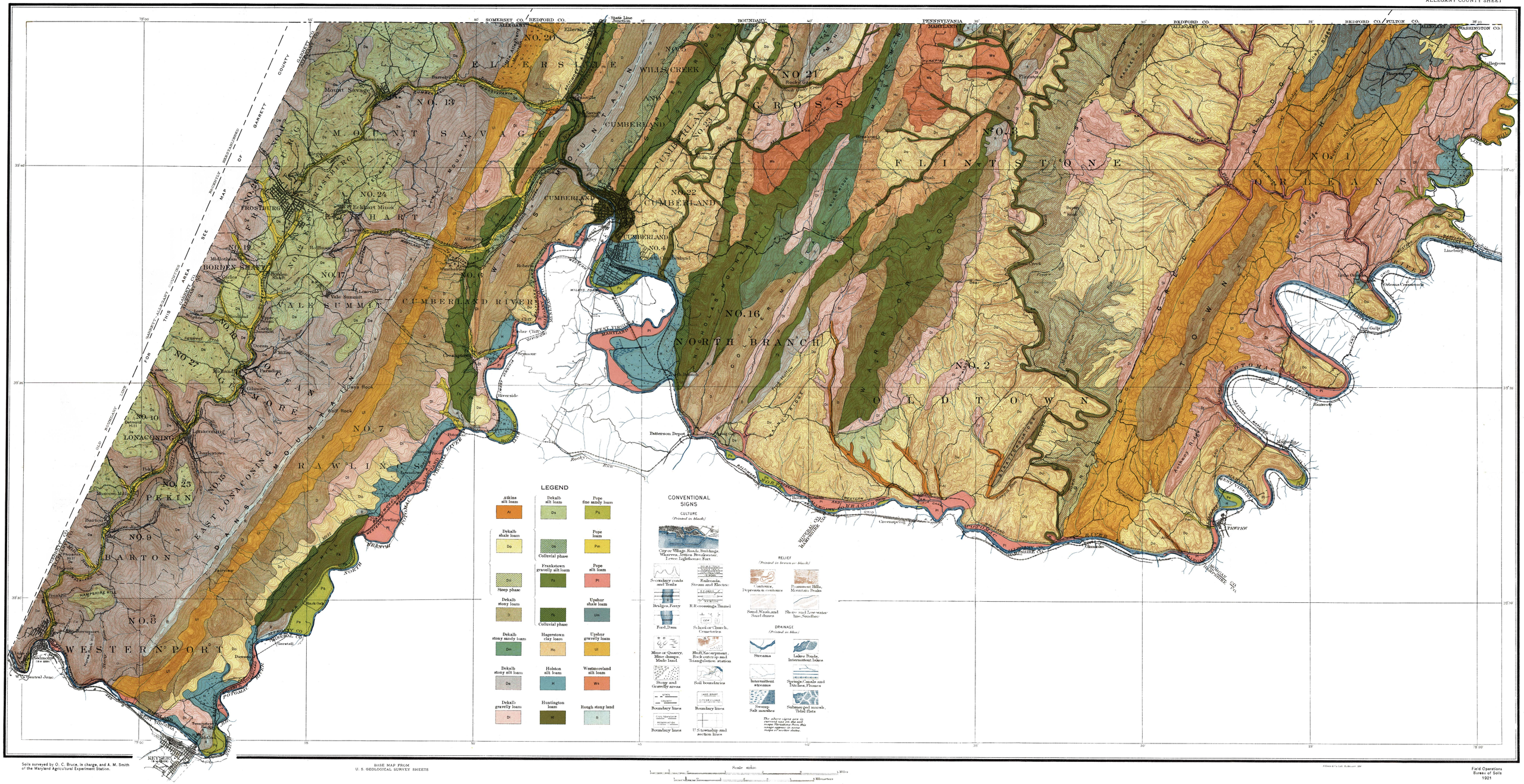
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF SOILS
IN COOPERATION WITH THE
MARYLAND GEOLOGICAL SURVEY AND THE
MARYLAND AGRICULTURAL EXPERIMENT STATION

SOIL MAP

MARYLAND
ALLEGANY COUNTY SHEET



Soils surveyed by O. C. Bruce, in charge, and A. M. Smith of the Maryland Agricultural Experiment Station.

BASE MAP FROM
U. S. GEOLOGICAL SURVEY SHEETS

Field Operations
Bureau of Soils
1921